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AN ANALYSIS OF THE EFFECTS OF MULTIPLE SETTING EVENTS ON THE SOCIAL BEHAVIOR OF PRESCHOOL CHILDREN WITH SPECIAL NEEDS

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We examined the effects of four combinations of setting events on the social interactions of 7 preschool children with social delays. In Study 1, the status of the teacher, activity materials, and peer varied across conditions. In Study 2, the status of the teacher and materials varied across conditions. Within the combinations of setting events, we also examined teacher behavior. Teacher presence and absence was varied in both studies. The type and rate of teacher prompting were varied in Study 2. The four combinations of setting events produced different rates of social behavior by the children with social delays. The optimal combination of setting events for promoting peer interaction and reducing teacher–child interaction included teacher absence from the activity, a limited number and form of materials, and children paired with a socially skilled partner.

DESCRIPTORS: social skills, setting events, preschool children

Children with developmental delays and/or social deficits may not develop appropriate peer interactions without specific interventions (Beckman & Kohl, 1987; Odom & McEvoy, 1988). As a result, research efforts have focused on the identification of training methods, environmental arrangements, and the types of experiences that will promote effective peer relations and reduce ineffective or aversive peer interactions. Through ecobehavioral studies, setting events or stimuli that promote or inhibit successful peer interactions have been identified and introduced in situations (e.g., free play) in which peer interactions are desired (e.g., Brown, Fox, & Brady, 1987; Nordquist, Twardosz, & McEvoy, 1991; Odom et al., 1990). For example, Guralnick and Groom (1988) evaluated the effects of group composition on preschool children's peer- and adult-directed social behavior, play, and communication during free play. They observed play groups that contained children with and without disabilities and groups that contained only children with disabilities. They reported that integrated play groups facilitated peer interaction, whereas segregated play groups constrained peer interaction and promoted adult–child interaction.

Four environmental variables have been identified consistently as strong determinants of preschool children's peer interaction. These include (a) adults in the setting, (b) available toys and materials, (c) peer groupings, and (d) amount of available space. Ecobehavioral research has revealed facilitative and inhibitive features of each of these setting events on the peer interactions of young children.

Adults may facilitate or inhibit peer interaction, dependent on their presence and behavior during play. Several investigators have reported that teacher presence tends to decrease peer interaction (Gump, 1978; Innocenti et al., 1986). Guralnick and

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Groom (1988) suggested that amount of teacher interaction, rather than teacher presence, may influence peer-directed social behavior. Alternatively, Shores, Hester, and Strain (1976), Strain and Fox (1981), and Walker, Greenwood, Hops, and Todd (1979) found the timing and type of teacher interaction to influence social behavior.

Materials and toys also influence the amount and nature of social interaction. Specific types of toys (e.g., cars, games, gross motor equipment, and sociodramatic materials) may promote peer interaction (Odom, Hoyson, Jamieson, & Strain, 1986; Quilitch & Risley, 1973; Roth & Clark, 1987), whereas other toys (e.g., small manipulatives, clay, books, and puzzles) often inhibit interaction and promote parallel or isolated play (Martin, Brady, & Williams, 1991; Strain & Kerr, 1981). In addition, limited numbers and varieties of materials tend to promote sharing and positive peer interaction (Rubin & Howe, 1985; Skellenger, McEvoy, McConnell, & Odom, 1991).

Peer interaction typically occurs more often in small groups that contain 2 or 3 children (Speigel-McGill, Bambara, Shores, & Fox, 1984) and among same-gender peers (Rubin & Howe, 1985). For children with disabilities, groups that contain developmentally advanced or socially skilled peers often promote social interaction (Odom & Strain, 1984; Strain, 1982). Peer interaction is also enhanced in integrated settings that contain a mix of normal children and children with social deficits or handicaps (Guralnick, 1990; Martin et al., 1991; Strain & Odom, 1986).

The amount of space and the number of children within a play area also influence peer interaction. In general, small areas result in more peer interaction than large play areas (Brown et al., 1987). Speigel-McGill et al. (1984) found that peer interaction occurred more often when children with severe multiple handicaps were within 1 to 5 ft of each other than when they were 10 ft apart.

Although considerable information is available concerning the facilitative and inhibiting features of single setting events, there are few analyses of the influence of combinations of setting events. In many studies only the status of the setting event of interest is described and controlled or manipulated, whereas the status and subsequent influence of other variables on social behavior are unknown or are not identified, controlled, or measured (e.g., Guralnick & Groom, 1988; Innocenti et al., 1986). Systematic data concerning the influence of combinations of settings events and controlled examination of the influence of single or multiple events on social interaction are needed (Greenwood, Delquadri, Stanley, Terry, & Hall, 1985; Odom & McEvoy, 1988).

We designed two studies to examine the influence of four combinations of setting events on the social interactions of children. The four combinations of setting events represented environmental arrangements likely to occur within preschool programs for children with or without disabilities. We also examined the effects of teacher presence or absence and the type and rate of teacher prompting on peer interaction. In Study 1, three setting events, teacher, materials, and peer group, varied across conditions while the amount of space remained constant. In Study 2, the teacher and materials varied across conditions, while the amount of space and the peer group remained constant.

STUDY 1

Method

Subjects and Setting

Target subjects. Three 4-year-old children, enrolled in a half-day special education preschool serving children with language delays, were selected by their teacher for participation because of infrequent or aggressive interaction with peers. Social interaction deficits for each child were indicated by scores from the Teacher Rating of Social Interaction Scale (TRSI) (Odom, Bender, et al., 1988) completed by an independent observer who was naive to the purpose of the study, and narrative recordings (Sulzer-Azaroff & Meyer, 1977) completed by the first author during free play.

Sara, a 4-year 10-month-old girl, had been enrolled in the program for 5 months prior to intervention. Expressive and receptive language delays and mild gross motor delays were identified using

the Sequenced Inventory of Communicative Development (SICD) (Hedrick, Prather, & Tobin, 1975) and Learning Accomplishments Profile (LAP) (Sanford & Zelman, 1981). Sara was described by staff as a shy, quiet child who experienced difficulties in cooperative play. She did not initiate or respond consistently to peers and typically refused to share with others. Sara often spoke to adults and to herself when playing with or near other children, but she seldom interacted with peers. Sara was difficult for teachers and peers to understand; she often stuttered and substituted the sound "K" for many consonants.

Doris, a 4-year 4-month-old girl, had been enrolled in the program for 17 months. She also attended a community-based day-care program. Her parents were diagnosed as developmentally disabled. Assessment with the SICD and LAP identified mild delays in all developmental domains. Doris frequently engaged in self-talk or undirected vocalizations during solitary, proximal, and group play. Although she frequently initiated interaction with teachers and peers and responded to initiations, peer interactions were often inappropriate and were sometimes accompanied by physical aggression.

Roger was a 4-year-old boy with a cleft lip, gum, and palate. He had attended the program for 17 months. He exhibited severe articulation problems and expressive language delays, but functioned within age limits in other developmental domains. Roger was described as an extremely shy, nonassertive, isolated child. He often watched and played in proximity to other children, but seldom interacted with them. He typically used gestures to initiate and respond to peers, although he made vocal initiations and responses to teachers.

Peers. The remaining 6 classmates, 4 boys and 2 girls ranging in age from 3 years 9 months to 5 years 2 months, served as peers. Four of these peers were also identified as language delayed, as assessed by the SICD and LAP. Based on scores from the TRSI, 3 peers were assigned to a socially skilled group and 3 were assigned to a socially unskilled group.

Each subject was assigned 1 peer from the skilled group and 1 from the unskilled group. Sara was paired with a girl from the socially skilled group and a boy from the unskilled group. Roger played with a boy from the skilled group and a girl from the unskilled group. Both of Doris' peers were boys, because a peer of the same gender from the socially skilled group was not available.

Observations were conducted during 10-min play sessions, 4 days per week, in a partitioned area (2 m by 2 m) of the classroom. Children participated in one dyadic play session per day and were supervised by a teacher's aide.

Measurement System

Interval system. Subject and teacher behaviors were scored using a 10-s continuous interval system similar to one developed by Strain and Timm (1974). Each behavior category was scored once per interval. This provided a relative frequency of social and nonsocial behaviors. Data were collected for each subject for 5 min of the 10-min play session.

Social interaction code. The vocal and gestural behaviors of subjects were scored as initiations and responses.

1. *Initiations.* These were scored when a subject (a) touched the teacher or peer, (b) handed a peer or teacher an object, or (c) used the name of the peer or teacher. This definition allowed initiations to be distinguished from undirected vocalizations or self-talk and undistinguishable vocalizations. Initiations also were coded as either peer directed or teacher directed. Initiations could be prompted by the teacher, provided they met the definition for initiations.

2. *Responses.* These were coded for all subject vocalizations or gestures that did not meet the definition of an initiation and that occurred in the same or subsequent interval within which a vocalization or gesture was emitted by a peer or an adult. Responses also were coded as either peer or teacher directed. If both the peer and teacher behaved within an interval, the response was scored as directed towards the person whose behavior most immediately preceded the subject's response. For example, if a peer initiated to the subject and the

teacher prompted the subject to respond to the peer, the subject's response was scored as teacher directed, because the preceding behavior came from the teacher. If the teacher prompted the peer to share with the subject and the subject responded to the peer's offer to share, a peer-directed response was scored, because the most immediate preceding behavior came from the peer.

Teacher behavior. When the teacher was present in the play setting, her vocal and gestural behaviors directed to the dyad were scored. These behaviors included prompts for peer interaction, prompts and instructions concerning toy play, question asking, and general conversation. When the teacher was absent from the play setting (i.e., left the partitioned area), her behavior was scored only when she used the name of the target or peer.

Reliability. Reliability was assessed for 22% of the observations. The primary observer was an undergraduate research assistant who had prior experience collecting interval data in classroom settings. Reliability was conducted by the first author. Both observers were trained to a criterion of 80% prior to the start of the study. Training consisted of textual material and data collection of videotaped sequences of behavior and was done in preschool classroom settings. Interval-by-interval occurrence reliability was calculated by dividing the total number of agreements by the total number of agreements plus disagreements and multiplying by 100. An agreement was scored when two observers recorded the occurrence of the same behavior within an interval. The mean percentage agreement for peer-directed behavior was 86%, ranging from 80% to 91%. The mean percentage agreement for teacher-directed behavior was 80%, ranging from 60% to 100%. Occurrence reliability for teacher behavior ranged from 81% to 100%, with a mean of 94%.

Nonoccurrence reliability was calculated because some behaviors occurred at low frequencies (and accounted for the lower ranges of occurrence reliability). Nonoccurrence reliability was calculated by dividing *C* (the total number of intervals observed minus the number of agreements plus disagreements) by *C* plus *D* (the number of disagreements) and multiplying by 100. A mean of 95% was obtained for peer-directed behavior, ranging from 91% to 96%. Nonoccurrence reliability for teacher-directed behavior ranged from 85% to 100%, with a mean of 98%. A mean of 99% was obtained for teacher behavior, ranging from 98% to 100%.

Experimental Variables

The status of three setting events (teacher presence and behavior, materials provided, and peer group composition) was varied systematically across experimental conditions. The amount of space was constant across conditions.

Teacher. The status of the adult who served as teacher during the play sessions varied in one of three ways:

1. T1. The teacher introduced the activity by (a) providing a few instructions concerning how to use the materials, (b) specifying a goal for the activity, and (c) asking the children to play together. She then left the play area and did not interact with children during the play session.

2. T2. The teacher remained in the play area and physically or verbally prompted toy play and material use (e.g., "build a castle with your blocks") and teacher–child conversation (e.g., "what color is that?"). She did not reinforce or prompt peer interaction. The teacher was instructed to provide the same level of prompting she typically used during free-play situations.

3. T3. The teacher remained in the play area and verbally or physically prompted peer interaction (e.g., "ask Sara to help you"). The teacher was instructed to limit her interactions to prompting peer interaction and redirecting child behavior that was directed to her to the other peer in the dyad. The teacher also was instructed to provide the same level of prompting she typically used during free play. She received daily feedback and, if necessary, received prompts from the first author during the session.

Materials. This setting event was manipulated concomitant to the variation in teacher status. The first author selected 16 toys and materials from those typically available in preschool classrooms. These were not available to children at other times of the day.

1. M1. Play materials were limited in number

and form. For example, during an art activity, children colored one picture together using three crayons.

2. M2. Play materials were relatively unlimited in number and form. For instance, during an art activity, each child completed a picture, each with access to 15 crayons of varying colors as well as felt pens, stencils, stamps, and stamp pads.

Group composition. This variable also was manipulated concomitant to variation in teacher and material status.

1. P1. Subjects played with a peer from the skilled social interaction group.

2. P2. Subjects played with a peer from the unskilled social interaction group.

Experimental Design and Conditions

Alternating treatments. An alternating treatments design was used to assess the influence of experimental conditions on social interaction. In this design, two experimental conditions alternated within each intervention. The daily order of conditions was randomly determined, with the constraint that a condition was not scheduled to occur for more than 2 successive days. The number of sessions per condition varied across interventions; however, a nearly equal number of sessions was scheduled in each intervention.

Baseline. During baseline, the target children were allowed to select a peer with whom they would play, activity materials varied in number and type across sessions, and the teacher was free to interact with the children while in or out of the play area. Children received small, tangible reinforcers at the end of each session for coming to and remaining in the play sessions.

Interventions. Following baseline, variations in the status of setting events for teacher, materials, and group composition were combined to produce three experimental conditions. For their participation, children continued to receive reinforcers at the end of each session.

Intervention 1: Standard and contrast conditions. The first intervention compared the following combination of setting events: T1M1P1 and T2M2P2. The first condition (T1M1P1) represented a combination that had been identified as facilitative of peer social interaction. That is, in this condition, the teacher was absent from the activity, materials were limited, and the peer was socially skilled and of the same gender as the target child (except for Doris, who played with a peer of the opposite gender). This condition is identified as the standard condition.

The alternating condition, identified as the contrast condition, included setting events that had been identified as inhibitive to peer interaction. In this condition, the teacher was present during the activity, materials were unlimited, and the peers were identified as socially unskilled and were of the opposite gender.

Intervention 2: Standard and standard/social prompts conditions. Following Intervention 1, the standard condition (T1M1P1) was compared with a standard/social prompts condition in which only teacher behavior changed (T3M1P1). In this condition, the teacher was present during the activity and prompted peer interaction. This condition is similar to situations that might exist when a teacher-mediated social skills intervention is added to a play group.

Results

Subject Behaviors

Initiations, as coded in this study, occurred in less than 5% of the total observation sessions, so were combined with responses to provide measures of subjects' social interaction. The daily percentages of peer-directed social interactions across conditions are presented for Doris, Roger, and Sara in Figure 1.

Peer-directed behavior. During baseline, both Doris and Sara engaged in variable amounts of peer-directed behavior, averaging rates of 19% and 26%, respectively. They doubled their rate of peer-directed behavior during the standard condition in Intervention 1, averaging 45% and 47%, respectively, although Doris' behavior continued to be highly variable. In comparison, their rates of peer-directed behavior did not increase above baseline during the contrast condition in Intervention 1. In fact, Sara's peer-directed behavior dropped to an average of 9%, and Doris' peer-directed behavior remained nearly equal to her baseline average, 23%.

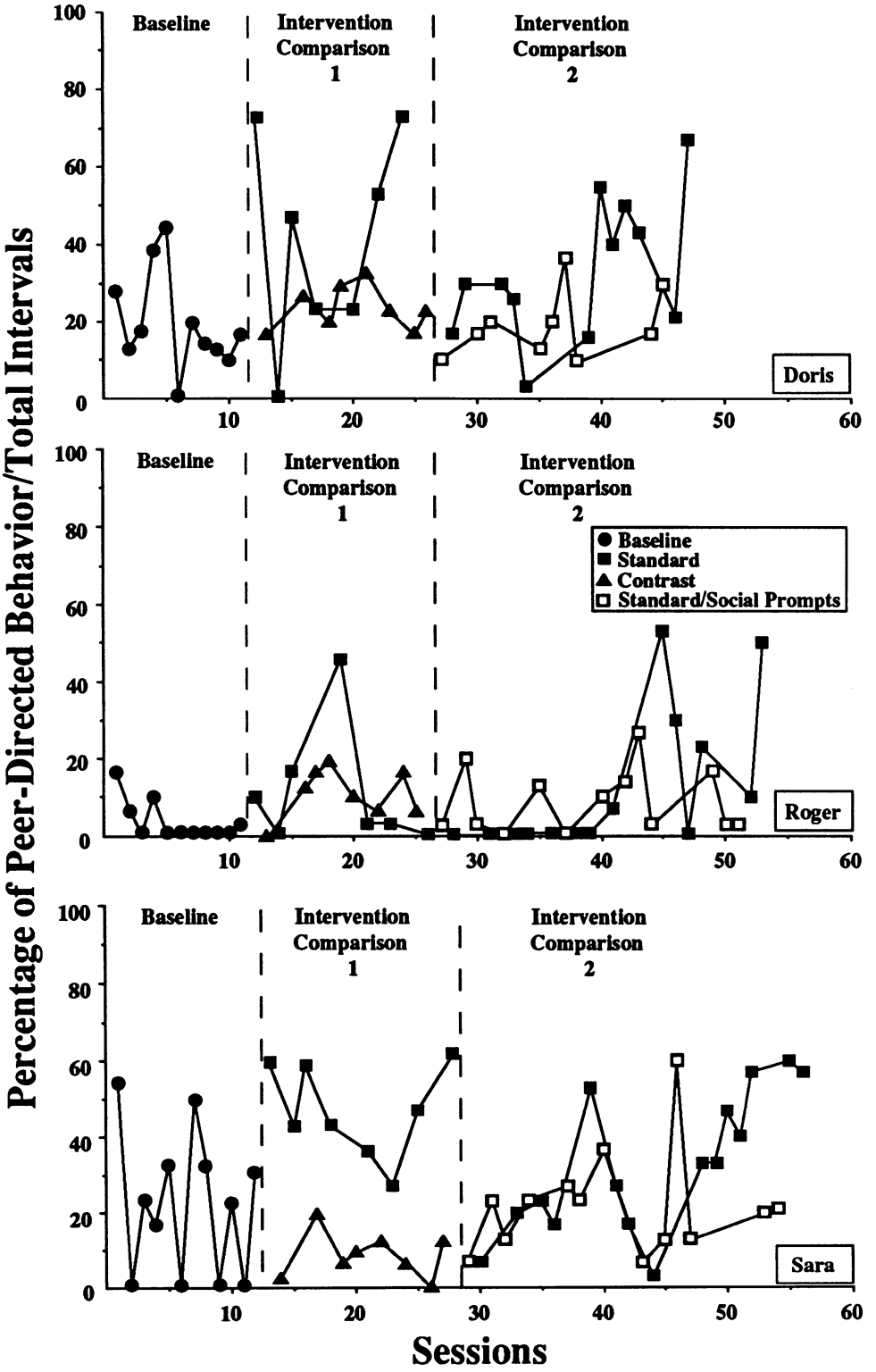

Figure 1. Mean percentage of peer-directed behavior over total intervals for Doris, Sara, and Roger in Study 1. Standard condition: teacher absent, limited materials, socially skilled peer; contrast condition: teacher present and prompts toy play,

Table 1
Mean Percentage of Subjects' Teacher-Directed Behavior and Mean Percentage of Teacher Behavior per Condition

Behaviors	Baseline	Intervention 1		Intervention 2	
		Standard T1M1P1	Contrast T2M2P2	Standard T1M1P1	Standard/ social prompts T3M1P1
Teacher-directed					
Doris	26	11	51	7	44
Sara	2	4	64	2	46
Roger	1	1	49	0	24
Teacher					
Doris	56	18	90	10	84
Sara	5	5	97	4	81
Roger	7	0	93	2	86

The results are less clear in the second intervention, which compared the standard condition with the standard/social prompts condition. Doris' and Sara's range of peer-directed behavior was similar in both conditions, although Doris exhibited an accelerating trend during the standard condition. The average percentage of peer-directed behaviors in the standard condition during Intervention 2 also was somewhat lower (31% and 32%, respectively) than the level observed in Intervention 1.

Roger rarely directed behavior to his peer during baseline. His level of peer-directed behavior, although generally low, increased to an average of 14% in the standard condition and to 11% in the contrast condition in Intervention 1, and remained at similar levels during both conditions in the second intervention. Interestingly, Roger occasionally exhibited surprisingly high rates of peer-directed behavior during both standard conditions, ranging above 40% on three occasions. His rate of peer-directed behavior also showed an increasing trend during the final six sessions of the standard condition during Intervention 2.

Teacher-directed behavior. The mean percentage of teacher-directed behavior per condition for each subject is presented in Table 1. As might be expected, levels of teacher-directed behavior were highest for all children during the two conditions in which the teacher was present in the activity (contrast and standard/social prompts conditions). The rates of teacher-directed behavior were highest in the contrast condition for all children.

Teacher Behavior

As shown in Table 1, the teacher seldom interacted with the children when she was absent from the play area during the standard conditions, and she interacted with the children during a majority of the intervals (93%) in which she was present during the contrast condition. When she prompted social interaction in the standard/social prompts condition, her prompts were somewhat lower, averaging 84% of the sessions.

Discussion

Doris and Sara tended to interact more with their peers when the teacher was absent from the play area, they played with a socially skilled peer, and materials were limited (standard condition). Roger interacted at low levels regardless of which combinations of setting events were in effect, although these levels were an improvement over almost no interaction during baseline. Setting events may not be sufficient to promote improvements in peer in-

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unlimited materials, socially unskilled peer; standard/social prompts condition: teacher present and prompts peer interaction, limited materials, socially skilled peer.

teraction for children like Roger, who may not have the necessary skills or whose behavior may have been ignored or punished in the past (Brown et al., 1987; Nordquist et al., 1991). Roger's speech was greatly impeded by his articulation impairment. Peers often indicated that they did not understand his vocalizations, and our observations showed that they frequently ignored his vocalizations. Setting events, as antecedent stimuli, may not be as robust in changing peer social behavior as interventions that include consequence strategies. For children like Roger, more intensive and intrusive interventions (i.e., peer- or teacher-mediated training) may be needed to establish a repertoire that will be responsive to setting events. However, the status of setting events should be considered in social skills interventions and manipulated to provide an environment supportive of peer interactions.

The role of teacher prompts also was examined in the contrast condition, in which the teacher was present and prompted toy play, and the standard/social prompts condition, in which the teacher was present and prompted peer interaction. Although these conditions were not directly alternated in the same intervention and included variations in the status of materials and peer groupings as well as teacher behavior, we might expect peer-directed behavior to be greater when the teacher prompted peer interaction than when she prompted toy play. This occurred only for Sara. Roger and Doris directed similar amounts of behavior to peers in both conditions. However, both prompting conditions included a very high rate of teacher prompts, which perhaps contributed to the similar low levels of peer-directed behavior. The influence of rate of prompting and type of prompt was further examined in Study 2.

STUDY 2

This study provided a partial replication of Study 1 with preschoolers who were considered at risk for developmental delays and school failure. In this study, teacher behavior and materials varied across conditions; group composition and the amount of space remained constant. Group composition was not varied because all of the children were identified as high risk for social delays and the peers and target children were of the same gender. A fourth variation of teacher behavior was introduced to form Condition T4M2; in this condition the teacher was asked to reduce her rate of interaction when prompting toy play. This condition was alternated with the original contrast condition, in which the teacher prompted toy play at a high rate, to examine the effect of rate of prompting on peer social interaction.

Method

Subjects and Setting

The participants were 4 girls who were enrolled in a community day-care center for children from low-income families and were considered at risk for developmental delays. These subjects ranged from 3 years 5 months to 4 years of age. Two of the girls, Sharon and Shelly, were twins and had been enrolled in the program for 17 months. The remaining 2, Tina and Vicki, had attended the program for 12 and 3 months, respectively. Subjects were selected for participation by program staff. The children were nominated for participation through teacher interviews. As in Study 1, social interaction deficits were indicated by test scores from the TRSI and by narrative recording.

Sharon and Shelly presented developmental skills within their age range, as measured by the LAP. They were described as dominant children who had problems sharing and playing with other children. They often asked peers to play, but were directive and impatient with children who failed to comply with their instructions. Both children requested teacher attention during play and preferred teacher attention to peer attention and interaction.

Tina exhibited mild delays on the LAP in social, cognitive, and language development. She often imitated peers' play and vocal behavior but did not share well with peers and often cried when instructed to share with another child. Tina initiated to peers, but she typically used incorrect peer names and was difficult to understand. Her initiations rarely produced responses. Tina frequently responded vocally to peer initiations, but often did not comply with peer requests.

Vicki displayed mild delays in fine motor, cog-

nitive, language, social, and self-help domains on the LAP. Vicki typically played at the periphery of a group, although she participated in group play when directed by other children. She often cried and preferred to interact with adults rather than peers. Vicki was able to initiate and respond to peers, but her vocalizations were often not related to the activity of interest or topic of conversation. She received inconsistent initiations and responses from peers.

Dyads were formed on the basis of teacher recommendation, with each child serving as subject or peer during observations. Sharon and Vicki were paired in one dyad, and Shelly and Tina were paired in another. Each dyad was observed daily for 5 min during a 15-min play session.

The day-care center was located in a converted apartment. Sessions were conducted in a room separate from the other children. Children played at a small table or in a partitioned area (2.5 m by 2 m).

Measurement System

The measurement and reliability systems and primary and reliability observers were identical to those described in Study 1. Reliability was assessed for 20% of the observations. The mean percentage of occurrence agreement for peer-directed behavior was 86%, ranging from 81% to 91% for all children. Agreement for teacher-directed behavior averaged 78%, ranging from 0% to 100%. The mean percentage of agreement on teacher behavior was 96%, ranging from 93% to 100%. The mean percentage of nonoccurrence agreement for peer-directed behavior was 88%, ranging from 74% to 95%. Nonoccurrence reliability for teacher-directed behavior averaged 97%, ranging from 83% to 100%. Nonoccurrence reliability for teacher behavior ranged from 90% to 100%, with a mean of 99%.

Experimental Variables

The variations in the status of teacher behavior and materials were identical to those described in Study 1, but an additional variation of teacher behavior (T4) was introduced and combined with unlimited materials (M2) to form a new condition, described as the contrast/reduced prompts condition (T4M2). In this condition, the teacher remained in the play area and verbally or physically prompted toy play, but did so only half as often as in the previous contrast condition. The teacher received daily feedback, and when necessary, she was prompted during the session. She did not reinforce or prompt peer interaction.

Experimental Conditions and Design

Baseline conditions were identical to those described in Study 1, with the exception that subjects played with their assigned partner each day, rather than selecting a partner. (This modification was made to accommodate the day-care staff.) Following baseline, variations of setting events for teacher and materials were combined to produce four experimental conditions and three interventions. An alternating treatments design again was used to assess the influence of experimental conditions on social behavior.

Results

Subject Behavior

As in Study 1, initiations were combined with responses to produce measures of social behaviors. The daily percentage of peer-directed behaviors across conditions is presented in Figure 2.

Peer-directed behavior. The levels and trends of peer-directed behaviors were similar for all 4 subjects. Each subject directed a variable level of behavior to peers in baseline, producing condition averages of 37% for Sharon, 34% for Vicki, and 43% for Shelly and Tina. All subjects directed a higher level of behavior to peers during baseline than the subjects in Study 1, whose baseline averages were 3%, 19%, and 26%.

During Intervention 1, the rates of peer-directed behavior were notably higher in the standard condition than they were in the contrast condition. For each child, peer-directed behavior was more than three times higher under the standard condition than during the contrast condition. Also for each child, the average rate of peer-directed behavior during the contrast condition was lower than the rate observed in baseline, ranging from 15% to 18%.

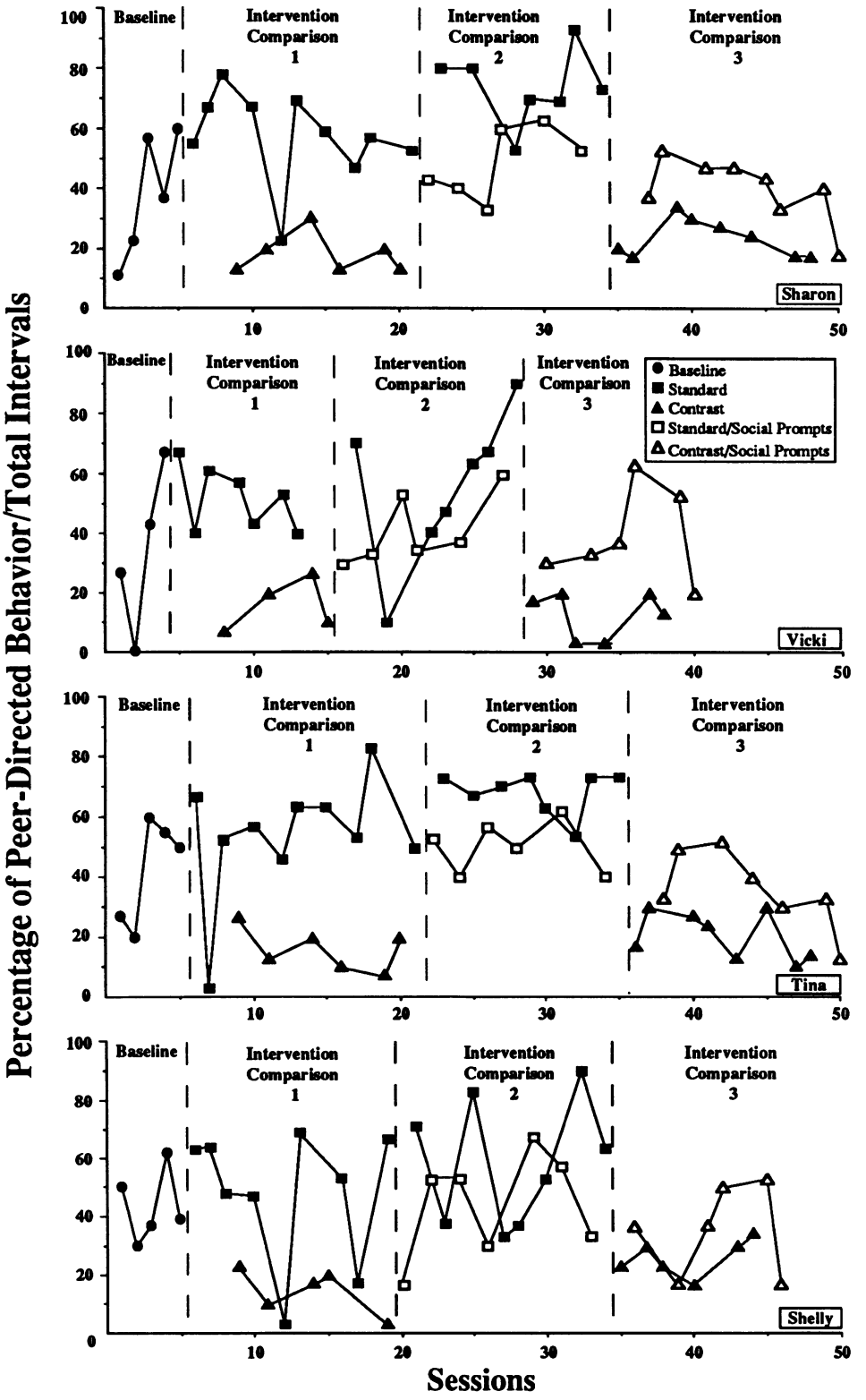
Percentage of Peer-Directed Behavior/Total Intervals
Baseline
Intervention Comparison 1
Intervention Comparison 2
Intervention Comparison 3
Sharon
Vicki
Tina
Shelly
Baseline
Standard
Contrast
Standard/Social Prompts
Contrast/Social Prompts
Sessions

Table 2
Mean Percentage of Subjects' Teacher-Directed Behavior and Mean Percentage of Teacher Behavior per Condition

Behaviors	Baseline	Intervention 1		Intervention 2		Intervention 3	
		Standard T1M1	Contrast T2M2	Standard T1M1	Standard/ social prompts T3M1	Contrast T2M2	Contrast/ reduced prompts T4M2
Teacher-directed							
Shelly	2	3	63	2	42	64	32
Sharon	1	2	66	0	42	69	31
Tina	6	2	55	5	32	59	33
Vicki	2	2	61	2	32	59	28
Teacher							
Shelly	3	4	97	2	60	97	50
Sharon	3	2	96	0	70	98	53
Tina	5	1	96	3	61	96	51
Vicki	4	1	97	3	66	96	47

During Intervention 2, subjects also interacted more with peers during the standard condition than they did during the standard/social prompts condition, although as in Study 1, the difference between condition means for 2 subjects (Vicki and Shelly) was less than 15%. The level of peer-directed behavior observed during the standard condition in Intervention 2 was equal to the level of behavior observed during this condition in the first intervention.

During Intervention 3, each subject interacted more with her peer in the contrast/reduced prompts condition than she did in the contrast condition, producing condition mean differences of 10% for Shelly, 15% for Tina, 21% for Sharon, and 25% for Vicki. The rate of behavior obtained during the contrast/reduced prompts condition was less than that obtained during the standard condition in Interventions 1 and 2 for each child, but they were nearly equal to the levels obtained during the standard/social prompts condition in Intervention 2 for 2 subjects.

Teacher-directed behavior. The mean percentage of each subject's teacher-directed behavior per condition is presented in Table 2. The levels and trends of teacher-directed behavior generally were similar to those obtained in Study 1. Each subject seldom directed behavior to the teacher during baseline and during the standard conditions in Interventions 1 and 2. The levels of teacher-directed behavior were greatest for all subjects during the contrast conditions in Interventions 1 and 3.

Teacher Behavior

Table 2 also presents the mean percentage of teacher behavior in all conditions. As in Study 1, the lowest rates of teacher behavior occurred during the standard conditions, and the highest rates of teacher behavior occurred during the contrast conditions (ranging from 96% to 97% of the intervals). These rates were successfully reduced during the contrast/reduced prompts condition, to a range of 47% to 53%. The teacher interacted with children

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Figure 2. Mean percentage of peer-directed behavior over total intervals for Tina, Shelly, Sharon, and Vicki in Study 2. Standard condition: teacher absent, limited materials; contrast condition: teacher present and prompts toy play, unlimited materials; standard/social prompts condition: teacher present and prompts peer interaction, limited materials; contrast/reduced prompts condition: teacher present and prompts toy play at a reduced rate, unlimited materials.

during 60% to 70% of the sessions during the standard/social prompts condition.

Discussion

The results of Study 2 provide additional support for the facilitative effect that the combination of setting events in the standard condition (teacher absence and limited materials) may have on children's peer interaction. The 4 children in this study consistently showed higher rates of peer interaction during the standard condition than they did in the contrast condition (in which the teacher was present and prompted toy play and materials were unlimited). The next highest rates of peer interaction occurred during the standard/social prompts condition, in which the teacher was present and prompted peer interaction, and during the contrast/reduced prompts condition, in which the teacher was present and prompted toy play at a reduced rate.

The differences in the percentages of peer-directed behavior obtained in the standard and contrast conditions may have been due to the inhibitive effects of the contrast condition as well as facilitative effects of the standard condition. Evidence for this comes from a comparison of the levels of peer-directed behavior obtained during the standard, contrast, and baseline conditions. Similar levels of behavior occurred in the baseline and standard conditions, whereas the contrast condition produced reduced levels of peer-directed behavior. It is not clear whether the differences in behavior obtained between the standard and contrast conditions were due to the facilitative and inhibitive effects of each condition or to the inhibitive effects of the contrast condition alone. However, in Study 1, the standard condition produced higher levels of peer-directed behavior than baseline conditions for 2 children. This is a question that merits further research.

Alternation of the contrast and contrast/reduced prompts conditions in the third intervention demonstrated that reduced rates of teacher prompts were associated with higher rates of peer-directed interaction. This suggests that the rate of teacher prompting is a critical factor in peer interaction. The extent to which the type of prompts that teachers employ affects peer-directed interaction cannot be determined empirically in this study, because we did not directly contrast peer interaction prompts and toy play prompts within an intervention. In addition, the number and type of materials varied across the two prompting conditions (standard/social prompts and contrast/reduced prompts). Further assessment of optimal rates of teacher prompting and type of prompting is needed with regard to the promotion of peer-directed behavior. Additional research is also warranted to examine the contributions that other setting events, in combination with teacher behavior, may have on peer interaction.

As noted above, we did not separate the effect of limited or unlimited materials from teacher absence or teacher use of social interaction or play prompts. Although the contribution of material status was not identified, we conclude that the combination of teacher absence and limited materials produced higher rates of peer interaction than combinations in which the teacher was present and prompted child behavior with limited or unlimited materials.

GENERAL DISCUSSION

This research extends the existing social skills literature by providing information concerning the influence of four combinations of setting events on the social interactions of young children. This information is important to applied research as well as to clinical application. From a clinical perspective, such information helps teachers maximize opportunities for children to interact with each other, whether in segregated or integrated settings. For instance, when the goal of an activity is to increase peer-directed interaction, our results indicate that the amount of teacher direction provided during the activity should be reduced. Practically speaking, it may be easier for classroom teachers to manipulate setting events than to implement more intrusive social skills interventions such as teacher- and peer-mediation strategies.

From an applied research perspective, this research provides additional confirmation that the role of the teacher is a critical variable associated with peer interaction. In our studies, the highest rates of peer-directed behavior occurred during conditions in which the teacher was absent. However, as Walker and his colleagues (1979) and others have suggested, the simple presence or absence of the teacher was not the only teacher variable associated with differential rates of peer-directed social behavior. In three of the conditions, the teacher was present and prompted either toy play (at high and reduced rates) or peer interaction. Peer-directed behavior was greatest when the teacher prompted peer interaction and when she prompted toy play at a reduced rate. These results support the speculation by Guralnick and Groom (1988) that high levels of peer interaction may result not only from integrated (vs. segregated) groupings but also from the reduced level of teacher–child interaction found in the integrated classroom.

Social skills interventions are often applied to children with more substantial social deficits than those exhibited by the children in this research. Replications with greater numbers of children and with children who exhibit more severe social delays are needed to support further our tentative conclusions concerning the importance of the rate of teacher prompting. If these effects are replicated (i.e., peer interaction increased as rate of prompts decreased), reduction in teacher prompting should be included in social skills interventions designed to increase peer interaction. In addition to replication, the effects of rate, type of prompt, and timing of prompts should be investigated in future research by examining the influence of different types of prompts (e.g., prompts for social interaction vs. toy play) under various rate conditions. For example, a parametric analysis of the rate of prompting could yield valuable information concerning the optimal rate of teacher interaction under various prompting conditions.

Future research should also address the degree to which the level of prompting observed in these studies represents the level of teacher interaction employed by other teachers in preschool settings. The level of prompting used by teachers in the standard/social prompts and contrast conditions was fairly high. Teachers were not instructed to provide a specific rate of prompting during either of these conditions. In fact, they were directed to interact with children at the same level they typically used during other free-play or teaching situations in the classroom. Whether these high rates of interaction reflect the behavior of other teachers is not known and may limit the generality of these data. However, the teachers indicated that their level of interaction was typical and that they found it difficult to reduce their rates of interaction during the contrast/reduced prompts condition.

This research provides information concerning the influence of the teacher as a setting event related to peer interaction and the influence of four combinations of setting events on peer interaction. It does not provide information concerning the contribution of the other setting events (e.g., materials and peer grouping) to the levels of social behaviors obtained, because the other setting factors were not independently varied across conditions. The contribution of individual components within a setting events package might be examined in future research by following the model used in this research to examine teacher behavior (i.e., by initially holding all factors constant and then manipulating factors individually). Alternatively, the contribution of individual components might be examined through a sequential introduction and withdrawal of individual components.

The contribution of individual components in setting events packages would be useful to examine, because in some preschool programs it may not be possible to maintain the facilitative status of each setting event. It may not be possible, for example, to provide socially skilled peers in some special education preschools. Nevertheless, if one or two facilitative setting events are maintained, it is conceivable they may be sufficient to promote desired rates of social behavior. However, Nordquist and his colleagues (1991) caution that the separation of the influence of single components may be a

difficult task to accomplish. They suggest that individual components of a package may be dependent on other components to an extent that meaningful separation and analysis are not possible. Further research is needed to explore this possibility.

There are some limitations related to the observation code and measures used in these studies. It is possible that the rates of subjects' peer- and teacher-directed behavior may have been affected somewhat by the temporal definition of behavior used in this research. As in previous research (e.g., Goldstein & Wickstrom, 1986; Strain, 1984), the direction of subject behavior was determined by a temporal definition rather than by topography or content. That is, subjects' vocalizations were coded as directed to the peer or teacher who spoke in the same or preceding interval. Although the validity of using temporal definitions has been documented in past research (e.g., Greenwood, Walker, Todd, & Hops, 1979; Strain & Timm, 1974), we recommend that in future research, content within a temporal framework be considered in determining the direction of social behavior. This would provide information about the quality of child–child interaction as well as information about the direction of behavior. Content was not examined in our studies due to the profound deficits in articulation exhibited by several of the subjects; however, inappropriate physical and verbal behaviors were anecdotally recorded.

Finally, it should be noted that the combinations of setting events that produced the greatest levels of peer interaction in this research do not reflect common practices in many special education preschool classrooms (Odom, McConnell, McEvoy, & Fox, 1988). One may question whether this limits the social validity of our studies. Many teachers frequently promote teacher–child interactions, prompt and reinforce behavior at high rates, provide multiple materials, allow children to select play partners, and fail to limit the size of the area within which children play. These common practices tend to promote teacher-directed interaction, as was observed in the contrast condition. Although teacher–child interaction is a legitimate goal for a preschool program, it should be recognized that such play groups and settings tend to inhibit peer interaction, which also is a legitimate goal for young children with disabilities. Although the types of setting arrangements that produced peer interaction in this research may not be typical of preschool classrooms, these setting events, or variations thereof, can be implemented in preschool classrooms to promote peer interaction. Teachers should identify the type of goals they have for children and then develop diverse play areas that contain setting events that promote the specific types of behaviors they have identified (e.g., peer interaction, adult–child interaction, independent toy play).

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